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# Combat Crew

strategic air command

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★★★★

JUNE 1978

# WE'RE NUMBER ONE!!

Lt. Gen. Edgar S. Harris, Jr., vice commander in chief of the Strategic Air Command, opened the 11th renewal of SAC's missile combat competition on April 28. In his opening remarks, he stressed:

"Never before in history has there been weapon systems to compare with the strategic missile force in readiness, in reliability and in accuracy. But as you know, hardware alone is not enough. A missile without a trained and competent crew makes little contribution to our defense. It is you — the combat crew, the maintenance, security, civil engineering, and communications teams — who make the missile system what it is."

On this note Olympic Arena '78 was underway and from the first day of exercises competition was stiff.

Front-runner in the first day of exercises in the competition was the 44th Strategic Missile Wing Ells-

## FLARE

**WE'RE NUMBER ONE! — Colonel Charles L. Lipscomb, commander, and members of the 91st Strategic Missile Wing, Minot AFB, earned the right to cheer for themselves at Olympic Arena '78. They dominated the Strategic Air Command's eleventh missile combat competition, winning the Blanchard Trophy, symbolic of the best missile wing in SAC, and 9 more of the 30 awards available to them. It was the first Blanchard win for the Minot missileers. After a last place the first day of competition, the 91st SMW pulled into first place the next day and held-on through the end of the competition.**

worth AFB. The Minuteman missile wing, a onetime winner of the Blanchard Trophy in 1970, took an early lead in the meet by posting the highest composite maintenance, communications, security police, civil engineering and operations scores in their exercises for the day.

Ellsworth's score, compiled by the Operations Team (566 points), the E-Lab Team (274 points) and the Communications Team (194), also placed the wing ahead of the other five Minuteman wings in the competition for Best Minuteman Wing and Best Operations honors.

In second place for Best Minuteman Wing was the 341st Strategic Missile Wing, Malmstrom AFB, followed closely by the 321st Strategic Missile Wing, Grand Forks, AFB.

The Best Titan II Wing lead position after the first night's score postings was held by the 308th Strategic Missile Wing, Little Rock AFB. The unit compiled a total of 334 points in exercises by the Maintenance Team (279 points), and the Security Police Team (55). The unit's scoring also gave them an early lead for the Best Munitions Team and Best Titan Security Police Team. The 381st Strategic Missile Wing, McConnell AFB, was in second place for Best Titan II Wing.

At the midway point in Olympic Arena '78, and the second night of score posting, the 91st Strategic Missile Wing, Minot AFB, held the lead for the Blanchard Trophy. After the two days of competition, the Minot competitors tallied 1560 points, 92.9 percent of the possible score in their completed exercises. In second place, just 2.3 percent behind was the 44th Strategic Missile Wing, Ellsworth AFB, the first day's leader.

The Minot wing moved into first place when one of their operations teams turned in a meet-pacing score. At the end of the record day's competition, the 91st Strategic Missile Wing led the other SAC ICBM units in the standings for the Best Minuteman Wing, Best Operations, Best Crew, Best Min-

# Combat Crew

*Magazine of the Strategic Air Command - 28th Year of Publication*

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## ON OUR COVER

**SAC KC-135 "Stratotankers" refueled the E-3A Airborne Warning and Control System (AWACS) aircraft during Brave Shield 17. (USAF Photo by Capt. Tom Quinlan)**

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(Above) The victors return home. (Right) Commanders of the nine missile wings drew envelopes containing competition schedules from the Blanchard Trophy. (L-R) Colonels George Holt, Jr., 321st SMW, Grand Forks AFB; Donald F. Gaylor, 381st SMW, McConnell AFB; Ralph E. Spraker, 44th SMW, Ellsworth AFB; Clifford D. Cork, 351st SMW, Whiteman AFB; Charles L. Lipscomb, 91st SMW, Minot AFB; James E. Cowan, 90th SMW, F. E. Warren AFB; Gary E. Marsh, 308th SMW, Little Rock AFB; Charles H. Greenley, 390th SMW, Davis-Monthan AFB; and Allen K. Rachel, 341st SMW, Malmstrom AFB. Photo by A1C Pete Lacker.

uteman Electro-mechanical Team, Best Security Police, Best Civil Engineering, Best Minuteman Electronics, and was tied with the 390th Strategic Missile Wing, Davis-Monthan AFB, for Best Communications. The Minot Electronics Laboratory (E-Lab) Team scored a near-perfect 299 of 300 possible points in their exercise.

In third place following that night's score posting was the 381st Strategic Missile Wing, McConnell AFB. The McConnell missilemen took the lead for Best Titan II Wing, Best Titan Crew, Best Maintenance and Best Titan Facilities Team.

In other categories, the 351st Strategic Missile Wing, Whiteman AFB, led in the competition for Best Minuteman E-Lab Team and Best Refrigeration Team; the 44th Strategic Missile Wing led for the Best Minuteman Munitions Team and the 390th Strategic Missile Wing led for Best Titan Propulsion Team, Best Titan Munitions Team and Best Titan Communications Team. The 390th Strategic Missile Wing, Little Rock AFB, led for Best Titan E-Lab and Best Titan Electronics.

Then came the third and final day of all exercises for all units competing. At the final score posting it was the 91st Strategic Missile Wing taking top honors. And for the first time in the 11-year history of the Strategic Air Command Missile Combat Competition, the prestigious Blanchard Trophy went to the 91st Strategic Missile Wing of Minot AFB.

(Above) Lt. Gen. Edgar S. Harris, Jr., Strategic Air Command vice commander in chief, addressed the competitors at the opening ceremonies of Olympic Arena '78. Photo by A1C Pete Lacker.

(Left) Captain James Sweeder, the Missile Combat Crew Commander of a Minuteman Operations Team from the 321st SMW at Grand Forks AFB, is evaluated during the eleventh Missile Combat Competition. Evaluating Captain Sweeder's performance is Major David Box of the 3901st Strategic Missile Evaluation Squadron. The operations exercise takes about two hours and crew members were required to identify malfunctioning equipment or emergency situations and correctly analyze, control or resolve them. (Photo by SrA Fred Tucker).

After three days of intensive competition among the nine Minuteman and Titan II intercontinental ballistic missile wings, the 91st landed top honors by amassing 2783 points out of a possible 3000 to win Olympic Arena '78.

Winning Best Titan II wing honors was the 381st Strategic Missile Wing, McConnell AFB. The Kansas wing also finished in second place overall, trailing the winner by only 27 points.

The Minot competitors dominated the operations area of Olympic Arena competition winning Best Operations, Best Crew and Best Minuteman Crew. In addition, they take back to North Dakota the trophies for Best Minuteman Security Police Team and Best Minuteman Communications Team. They also garnered the Air Force Association's award for Best Minuteman Operations.

In addition to their standings as top Titan II Wing the McConnell

(Left) — 1Lt Randall L. James, seated front, and 1Lt Edward F. Teigeler, III seated rear, of the 91st SMW, receive their evaluation from Captains William Allen, front left, and Ronald Forrester, rear, of the 3901 SMES. The Minot crew received the highest single score for a missile combat crew exercise, based on its ability to identify malfunction situations or emergency requirements and correctly analyze, control or resolve them. Photo by Sgt Gary Loepke.

(Center) — Capt Dana H. Bell, MCCC 1Lt Kenneth J. Dziewulski, DMCCC and SSgt Michael B. Hollon and SSat John W. Edwards, missile technicians, from the 381st SMW are evaluated in a Titan II Launch Control Simulator at Vandenberg AFB, during Olympic Arena '78. Photo by SRA Fred Tucker.

(Bottom) — SSgt Bonifacio Chavez, Jr., and SSgt Richard S. Krause work on a diesel generator as part of a civil engineering exercise in the Missile Combat Competition. Sergeants Chavez and Krause, represented the 390th SMW, from Davis-Monthan AFB. Their exercise was similar to tasks they perform at their home base and was scored on the basis of their knowledge of technical data, accuracy, and performance within a specified time frame. Photo by Sgt Gary Loepke.

AFB unit won awards for Best Maintenance, Best Titan Propulsion Team, Best Titan Facilities Team, Best Security Police Team, Best Titan Security Police Team and Best Titan Electronics Laboratory Team with a perfect score. The 381st Strategic Missile Wing also carried home the Air Force Logistics Command Best Titan Logistics Trophy and the Air Force Association Titan Operations Trophy.

The 90th Strategic Missile Wing, F. E. Warren AFB, won three categories: Best Minuteman Refrigeration Team, Best Civil Engineering Team and Best Minuteman Electronics Team. The 308th Strategic Missile Wing, Little Rock AFB, finished third overall. They won best Communications Team and Best Titan Communications Team. The 390th Strategic Missile Wing, Davis-Monthan AFB, won the awards for Best Titan Munitions Team and Best Titan Electronics Team. The 351st Strategic Missile Wing, Whiteman AFB, took the award for Best Minuteman Electronics Team. The 341st Strategic Missile Wing, Malmstrom AFB, won the Best Minuteman Munitions Team.

# Let's Hear It For COPILOTS

**Capt Gregory J. Anderson**
**380th BMW, Plattsburgh AFB**

A copilot is a lot more than a takeoff data doer, a checklist checker and a radio channel changer. We tend to take his duties for granted, because they are not outstanding in themselves: "Hey, nice job on that ground minimum control speed" sounds a little flaky. But from the standpoint of crew coordination, the copilot just MAY be the most important member of the crew.

A copilot is pretty much what he makes of himself. The nature of his job is such that he backs up the other crewmembers, whose specific functions are more precisely defined. And since it is the aircraft commander who gets credit for *commanding,* the navigator for *navigating* and the boom operator for *boom operating,* some copilots are content with merely *coping.* The result of minimal performance by the copilot is not readily identifiable as a reason for poor crew performance.

Nor is the result of maximal copilot performance readily identifiable as a reason for outstanding crew performance. Even if the copilot does an excellent job of assisting the pilot with flying the airplane, backing up the navigator on his rendezvous and nav leg, and working for the boom operator with his offload, he often receives little credit for his efforts.

Therefore, a copilot is also what we think of him. A new pilot who takes off out of Undergraduate Pilot Training and lands in the right seat of a multiplace aircraft goes through somewhat of an identity crisis. Subordinating his hard-earned total self-reliance to crew interdependence is a difficult adjustment. He will, however, more readily change his perspective from "self" to "crew" if he is accepted as an important part of a professional team.

One of the traditional rites of initiation for all new copilots is to endure the jokes, jobs and jumps (Did you hear the one about the freefalling copilot who was concentrating so much on doing landing data that he forgot to pull his ripcord?). But seriously, if we accept his inexperience, minimize his inevitable mistakes and encourage a crew perspective, the benefits will accrue to everyone.

In fact, I believe that the copilot is the most important determinant of crew coordination. Virtually all normal copilot duties are coordinative in nature, and the manner in which he performs them directly influences crew performance. A good copilot controls the pacing of crew functions by knowing what everyone else is doing at a given time and coordinating tasks according to planned mission timing criteria. He also insures the completing of these tasks by his adherence to the checklist. In effect, a good copilot controls crew coordination to enable each crewmember to do his own thing to the benefit of the crew as a whole.

And when all is said and done, this is as it should be. A good copilot may be the busiest member of the crew throughout the entire mission profile, but as an aircraft commander-in-training, what better way to learn and appreciate what **his** crew (including his copilot) will be doing for him someday.

# BRAVE SHIELD 17

**Lt Col Donald W. Neal**
**96 BMW/OI Dyess AFB**

Photos by TSgt. William R. Trent

(Above) CMSgt. Alva Langley, Fifteenth Air Force directorate of administration, and Lt. Col. Kenneth T. Roussel, 12th Air Division operations staff officer, perform duties at Lake Mead Base, Nevada as members of the Strategic Air Command advance echelon team during Brave Shield 17. The joint Armed Forces training exercise was conducted during early April in the western United States.

(Above center) Maj. Neil H. Lewis, headquarters, SAC, prepares a map for Brave Shield 17 flying activities. Major Lewis was assigned to SAC's 37 member advance echelon (ADVON) team during the joint-service exercise.

(Far right) Col. Charles A. Robertson, director of operations, 12th Air Division, monitors SAC ADVON team activities during a smoke/gas exercise by opposition forces at Lake Mead Base. Colonel Robertson served as vice commander for the ADVON team during Brave Shield 17.

(Right) Air Force Forces (AFORS) headquarters at Lake Mead Base drew comparisons to another time, another place. Army Air Corps volunteers also worked from camouflaged tents against a very real aggressor in the sands of North Africa, circa 1942. (U.S. Air Force Photo)

Over the years, Strategic Air Command has been charged with the responsibility of deterring nuclear war. Our fleet of bombers, tankers, and intercontinental ballistic missiles have been the cornerstone of the Nation's strategic deterrent force. In addition to the nuclear deterrent role, SAC is charged with yet another task and that involves non-nuclear contingency operations.

Strategic Air Command's participation in Brave Shield 17, a Joint Chiefs of Staff directed, United States Readiness Command sponsored, Joint Readiness Exercise, conducted within the range complexes of Nellis AFB, Nev., Edwards AFB, China Lake NAS, and Ft. Irwin, Calif., demonstrated how SAC assets can be integrated into a contingency role, becoming a supporting command to the Joint Task Force under U.S. Readiness Command, which was charged with conducting the desert environment contingency exercise.

Brave Shield 17 was conducted in three phases: a) deployment — 30 Mar through 7 Apr 78; b) employment — 8 through 16 Apr 78; and c) redeployment — 17 through 23 Apr 78. The scenario pitted two separate task forces against each other in the Mojave Desert, operating within a 642,000 acre area and involving approximately 23,000 military personnel.

Lt General John J. Burns, USAF, deputy commander in chief, U.S. Readiness Command, served as the

exercise director. He operated from Ft. Irwin, Calif., while the air component commander, Major General Fred A. Haeffner, vice commander, 9th Air Force, with whom we worked, was located at Lake Mead Base, Nev.

During contingency operations of this nature, SAC support to the component commander is through a Strategic Air Command advance echelon (SAC ADVON) team and the commander of the ADVON serves as CINCSAC's representative on the scene. The SAC ADVON team commanded by Brigadier General Christopher S. Adams, Jr., consisted of 37 members from Headquarters SAC, 15th AF Headquarters and several SAC wings, operated under field conditions at Lake Mead Base, Nevada, approximately two miles northeast of Nellis AFB, Nev.

The close proximity of the SAC ADVON operation to Air Force Forces (AFFOR) headquarters proved to have many advantages. The ADVON, charged with providing tactical support, advice, and counsel to the component commander, coordinated SAC bomber and tanker involvement, rendered assistance and advice on use of strategic reconnaissance, and planned and directed the missions. Expertise in routing, targeting, tactics, weaponeering and tanker support was readily available among the ADVON members which provided flexibility and quick reaction response in use of SAC resources.

During the battlefield targeting process, SAC ADVON received the target requests from the field commander which included: target coordinates, composition, parameters, and location of friendlies. Then, the ADVON team had to determine the hardness and vulnerability of the target elements, the weapon load to include fuzing, the number of aircraft and axis of attack to be employed. Finally, predicted results for target elements and CEP/weapons effect had to be reviewed.

In support of the exercise, on April 12 and 14 respectively, three B-52D Stratofortresses each from the 96th Bomb Wing, Dyess AFB, and 22nd Bomb Wing, March AFB, flew high-altitude sorties. The B-52 missions simulated bombing runs on targets within the four ranges, flying through a complex air defense system so as to provide realistic training for the B-52 aircrews.

During the bombing phase, two simulated conventional bomb releases were made. The first was a beacon release on a pre-determined target, while the second run was a synchronous release on a target that was called to the aircrew while airborne, using a series of pre-established offset points. Meanwhile, the SAC tanker task force composed of active duty SAC and Air Reserve Force units, was headquartered at Travis AFB. The tankers were charged with the responsibility of providing refueling support to the bomber forces, as well as the tactical (opposition and friendly) fighters. During Brave Shield 17, 70 KC-135 Stratotanker sorties were flown to support the tactical forces. For example, on April 6th there were 12 F-15 Eagles, and 23 F-4 Phantoms coming up to take on JP-4, while 20 sorties permitted 45 F-15s, 58 F-4s, 9 A-7s, and one RC-135 refueling on April 8th. Throughout the exercise, F-105 Thunderchiefs and the E-3A AWACS aircraft received fuel from SAC tankers, too.

Units providing refueling support were: 5th Bomb Wing, Minot AFB; 22nd Bomb Wing, March AFB; 92nd Bomb Wing, Fairchild AFB; 93rd BW, Castle AFB; 96th Bomb Wing, Dyess AFB; 320th Bomb Wing, Mather AFB; 101st Air Refueling Group, Bangor International Airport, Maine; 134th ARG, McGhee Tyson Airport, Tenn.; 141st Air Refueling Wing, Fairchild AFB; 157th ARG, Pease AFB; 160th ARG, Richenbacker AFB; 171st AREFW, Greater Pittsburgh International Airport; and 307th ARG, Travis AFB. In sum, SAC flew 70 sorties, refueling 340 aircraft.

Now that the detail has been covered, one might ask, why does SAC participate in exercises of this nature? Well, as I mentioned earlier, SAC's

(Right) Eighth Air Force Commander, Lt. Gen. Richard L. Lawson, receives a first-hand report on Strategic Air Command activities in Brave Shield 17 during an April 14 visit to Lake Mead Base, Nevada.

(Left) Part of SAC's ADVON team duties at Brave Shield 17 included the coordination of strategic reconnaissance missions. Working with the reconnaissance missions are (l to r) Lt. Col. Chris A. McAloon, headquarters, SAC; Capt. Dennis P. Borland, 55th Strategic Reconnaissance Wing; Lt. Col. Douglas F. Van Allen, Headquarters, SAC; and others.

mission is to deter war, particularly nuclear war by providing ready, flexible and credible strategic offensive forces capable of responding across a spectrum of threats to the vital security interests of the United States. Consequently, maintaining our comprehensive deterrent posture requires that we maintain a high state of readiness. We must be prepared and we must be capable of delivery, not only for a strategic role, but a conventional role, too. The demands of maintaining this capability are substantial. Consequently, since Brave Shield 15, in October 1976, SAC has become increasingly intent on developing its commitment to supporting non-nuclear contingency operations.

Brave Shield 17, where three U.S. Military Services were represented in the air and on the ground, provided a realistic combat environment for combat crew training. It provided an excellent opportunity for the SAC team to interface with other commands while operating under an air force component commander in field conditions. This experience benefited not only the aircrews, but also the staff where exposure to varying scenarios may become a model for future operations.

Exercises of this import also provide SAC an excellent opportunity to evaluate its responsiveness to strike targets with minimum warning. At the same time, it offers a challenge to develop more flexibility in our contingency training, thus improving our contingency capability.

Lt. Gen. Edgar S. Harris, Jr., vice CINCSAC, discusses Strategic Air Command participation in Brave Shield 17 with (l) Maj. Gen. Fred A. Haeffner, vice commander of 9th Air Force, and (r) Brig. Gen. Christopher S. Adams, Jr., 12th Air Division commander. General Haeffner served as commander of Air Force Forces during Brave Shield 17. General Adams commanded the SAC ADVON team at Lake Mead Base.

# STOP! THINK!! COLLECT YOUR

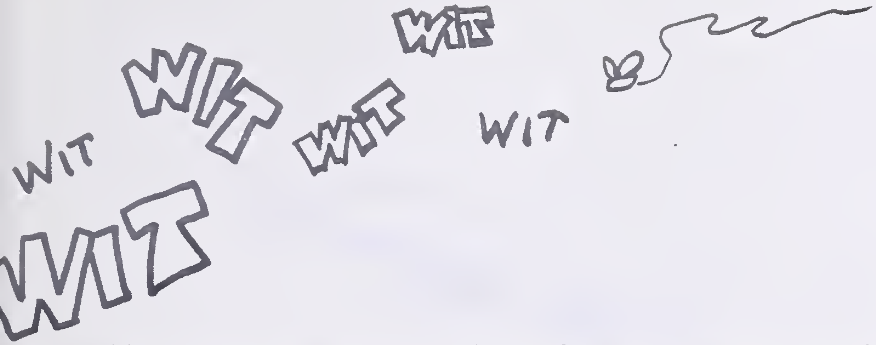
**Capt Lance Anthony Meneghelli**
**416 BMW, Griffiss AFB**

These three phrases combined apply to almost any type of emergency situation. In one form or another, they have been included in almost every Dash One in the Air Force. They constitute some very good advice to aircrews, and are also applicable to supervisors on the ground during aircraft emergencies. Minor discrepancies and events often combine to cause much more serious problems; situations that could result in a loss of both aircraft and crew.

A few years ago, a series of events combined to cause just such a hazardous condition. Due to operational committments, a tanker crew with a low experience level was sent TDY to provide refueling support at a northern base. This particular mission started out normally. The crew received their premission briefing which included a tactics review, communications review, NOTAMS, and weather briefing. The crew was briefed to "top off" their receiver and that the planned offload for this mission would be 52,000 pounds instead of the 45,000 pounds indicated on the "canned" mission log. (STOP!!)

Preflight was completed with only two aircraft discrepancies developing: a minor hydraulic pressure problem and a pilot's seat that could not be properly adjusted due to a broken seat adjustment handle. The hydraulic problem was fixed by applying heat to the system, and maintenance personnel made a temporary fix for the other problem by immobilizing the seat. The pilot tested the seat and was confident that the seat would not move. Just to be sure however, he briefed his copilot to take control and continue the takeoff if anything went wrong with the seat.

During the takeoff roll, shortly after S-1, the pilot's seat abruptly slid aft. The copilot took the controls and completed the takeoff. The weather at the time was a partial obscuration with one half mile visibility in ice fog, calm winds and a minus 44 degrees. Shortly after takeoff, the navigation radar became inoperative. As there were adequate navigation aids enroute and the forecast weather was favorable, the decision was made to continue the mission. A successful refueling was made, offloading an



additional 3,000 pounds over the briefed offload to "top off" the receiver. (STOP!) The tanker then reversed course to return to base.

Upon entering the local area, the crew received the weather and clearance for an enroute descent from the Air Traffic Control Center, and contacted the command post to pass the mission and maintenance status. Approximately nine minutes later, the command post told the tanker to divert to their filed alternate and asked how much fuel they would arrive with. It seems that during the descent another aircraft made a low approach and the field immediately went below minimum due to ice fog. The navigator made a quick route determination using airways as the most practical route since the radar was inoperative and the ATC controllers were out on strike. This added approximately one-hundred and thirty nautical miles to the route over the straight line distance that the divert fuel was planned on. The crew had not been informed of any divert route. (STOP!) The new fuel reserve was rapidly computed (using ground distance) and found to be below the command fuel reserve. (STOP!) As a result, a noncommand base was selected by the crew as a divert base, and the command post was advised of the divert situation and they asked the nearest SAC base to have a B-52 ready to provide a reverse refueling capability for the tanker. The NAF command post then advised the tanker several times that the B-52 would be available for reverse refueling. (STOP!) Each time the pilot declined to use it.

When the tanker was approximately 200 miles north of the new divert base, the number one engine oil pressure began excessive fluctuations accompanied by illumination of the warning light. Over-flying a suitable Canadian base, the pilot then elected to use the B-52 and onload 30,000 pounds of fuel. They notified the NAF command post of their intent and asked "is there anything you want to tell us about reverse refueling or anything like that?" (STOP!) The command post reply was "negative. It's your judgement and you get it out of the checklist there. If you want it, it's available. Don't delay your recovery at . . . to refuel. It's up to you to use if you want it." (STOP!)

The NAF Director of Operations had earlier asked for an update on the situation and the weather status of the divert base. He was advised that the filed alternate was "the closest one on the northern tier." (STOP!) The tapes do not indicate that the DO was ever advised of the possible use of the non-SAC base and everyone neglected the possibility of using a Canadian base. (STOP!) He apparently was not advised of the 22 knot crosswind and snow on the runway at the filed alternate either. (STOP!)

At any rate, a successful rendezvous was made south of the second divert base and continued southbound, anticipating a 30,000 pound transfer at that time. T.O.1.-1C-1-3 did not clearly specify that during reverse refueling only the aft body tank will receive fuel. This crew was qualified in a modified version of the KC-135 which does have a provision for a PREPLANNED (on the ground) movement of fuel from the aft to forward tank. The hookup was made with approximately 10,000 pounds remaining and they proceeded south, onloading fuel. The crew noticed that the fuel was only going into the aft tank and terminated the refueling after only an 8,000 pound onload. They turned northeast and proceeded to their filed alternate. Enroute they computed a C.G. and found that with the 8,000 pound onload, the C.G. was sitting at 36%, the aft limit!

I don't feel that it is really necessary to itemize the points where a brief pause to

**STOP**
**THINK**
**COLLECT YOUR WITS**

would have simplified things and resulted in a little less aggravation for everyone concerned, both in the air and on the ground. It was a lesson learned by those involved, including the ten members of the investigation board that spent almost three weeks researching these events. The final report was almost an inch and a half thick. I sincerely hope that we won't have to do it again.

By the way, the tanker made an uneventful recovery with 8,200 pounds of fuel at shut down. This was approximately 1500 pounds less than he would have had if he had proceeded directly to his alternate without refueling.

## When Does 2-1=4?

**"Accomplish ACE flying in a** *minimally structured environment.*" **ATC/SACR 60-8**

If you ever wanted to see a bunch of safety officers cringe in unison, you should have been in the ATC Safety office when that sentence was published. To say the least, the thought of conducting a safety program in a minimally structured environment was not very appealing. Despite all the dire predictions by the "hardcore" the program has succeeded, but that doesn't mean that everything has gone smoothly.

Every once in a while, we (ATC Safety) receive a mishap report that makes us wonder how the ACE pilot made a decision. At first, this led us to make comments about the pilot's competence or question his judgment. However, after a couple of years of ACE involvement, we've begun to realize that the problem is one of attitudes and our perceptions, and not a matter of competence.

Basically, there is no ATC mission that cannot be delayed until tomorrow if conditions are adverse today. SAC's EWO mission does not allow this option. Fortunately, the engineers recognized the needs of the mission and designed SAC aircraft with enough all weather equipment and redundance to facilitate a "press" approach if required.

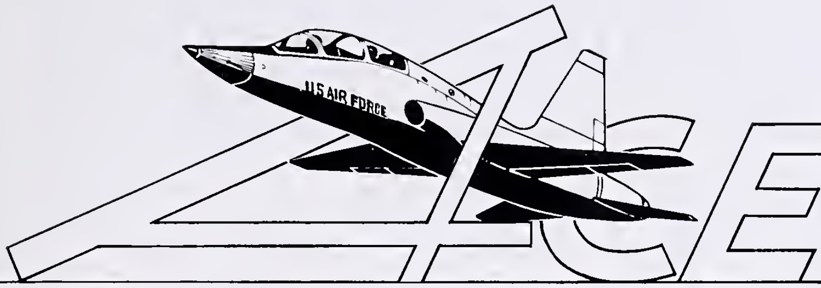
ATC aircraft were designed with a slightly different mission profile and in many ways are only one small step from an emergency. With no weather radar, no anti-skid or functional anti-ice, the weather capability of our fleet is limited at best. Lose one radio and you are NORDO. Lose one navaid and you may be lost. Lose one generator, hydraulic system, or engine and you may earn your flight pay if the conditions are not just right.

ATC pilots operating in the UPT environment have never been shy about aborting early and getting it on the ground before a problem begins to snowball. On the other hand, ACE pilots are bringing their "press" orientations to the T-37/T-38 and tend to continue where faint hearts dare not go. This has led to some decisions that we consider questionable and sometimes luck has played an important role in preventing a mishap. The ACE program is designed to increase judgment and pilot experience so the tendency after a close call may be to say, "Well, nothing is lost and the crew learned a valuable lesson." The other side of the coin is that a safety program cannot be based on luck.

In the future, we will publish information that explains the limitations and capabilities of ATC aircraft. We're not trying to change your "press" orientation because if the balloon goes up, you'll need it. However, we will try to show you a different viewpoint on operating training aircraft in a peacetime environment and the approach we have to airborne problems.

Example 1: You are a B-52 copilot flying a T-38 and lose one J-85. How many engines do you have left? In the context of a B-52, the problem is similar to losing half your thrust, so you would be down to four engines and they're all on the same wing. This may be an exaggeration of the problem but neither situation is the type of thing a reasonable pilot takes lightly.

**Capt Ted Schofield**
**ATC Flight Safety**
**Randolph AFB**



# ACE TOPICS

## Keep the Fire Burning

Few things will flame out the J-85 (or any other engine for that matter) faster than fuel starvation. Obviously, to prevent this, you land before fuel starvation occurs — right? That might be harder to do than you think.

The book says if a fuel imbalance is experienced for no apparent reason, perform gauge test prior to crossfeeding. What do you do if gauge test and quantity check look good? If the fuel indicating system is what's malfunctioning, you could crossfeed yourself right into a flameout. We've had this happen several times in the past. Fortunately, the flameouts that resulted haven't cost any lives or airplanes — yet!

The bottom line is this: fuel imbalances don't just happen without a reason. The difficult part is trying to figure out that reason. If a pilot is uncertain of why he has an imbalance, he should remember that the fuel quantity indicating system, like everything else, can malfunction from time to time. You have to crosscheck and compare other indications as well.

Ultimately, the pilot has to decide the best course of action for his particular situation. A thorough systems knowledge and sound fuel management procedures should help keep the fire burning — (uninterrupted!!).

**Captain Seeley**
**ATC Flight Safety**
**Randolph AFB**

## To Check or Not to Check?

A few days ago I was called down to Transient Alert to look at a T-37 from another base that had experienced a fuel imbalance. The pilots were SAC copilots, and both were qualified in the T-37.

The pilot-in-command reported that for the **last 3 hops** they rapidly developed a 200-pound fuel imbalance, left wing heavy, soon after level off. Going to emergency permitted the imbalance to increase to 450 pounds before rudder was finally used to correct the imbalance. At no time did a pilot note a disparity between total fuel remaining and flight plan fuel. At each enroute base they obtained permission from the ACE SOF at their home station to press on to an ATC base.

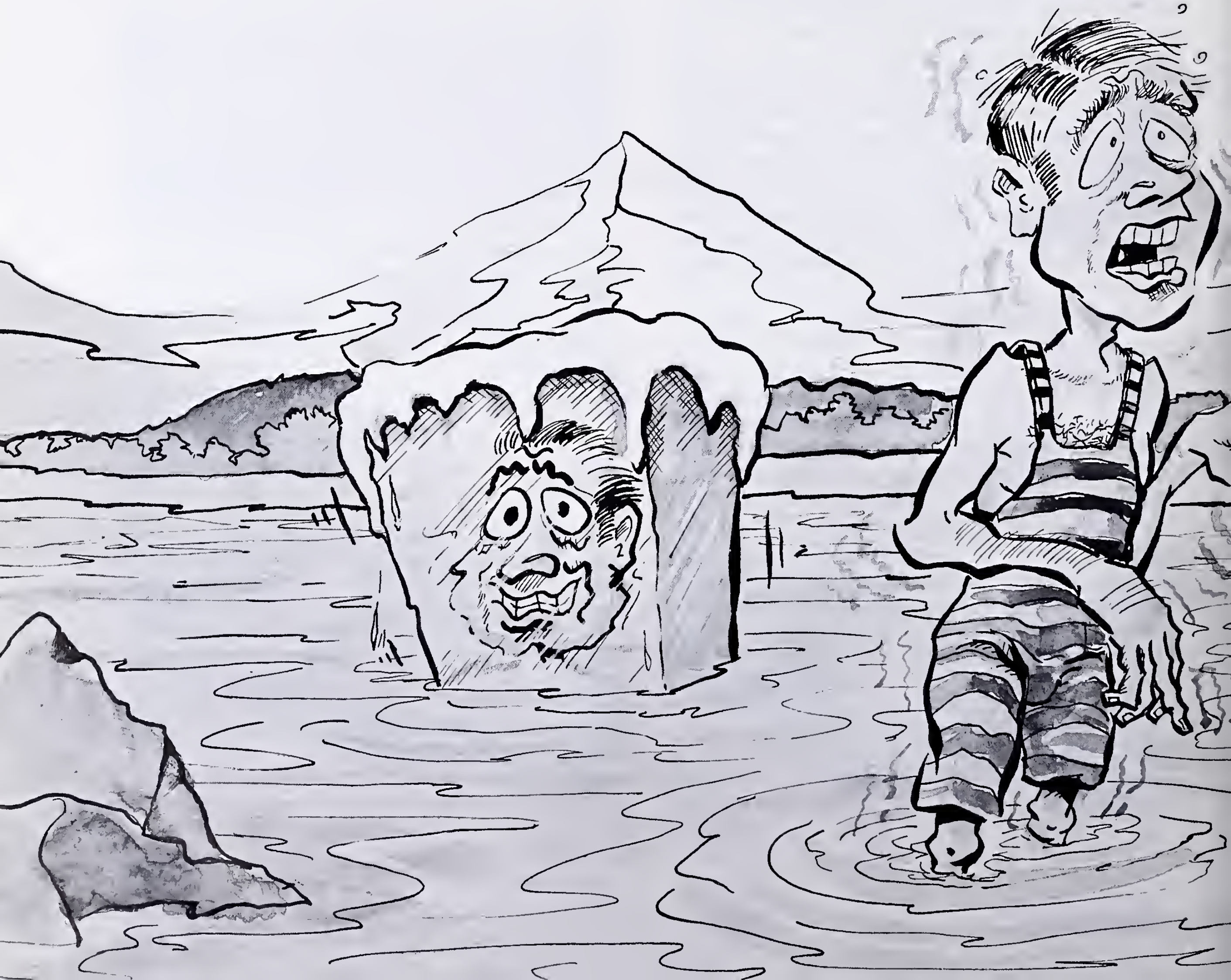
Now these fellows were very concerned about their fuel problems; however, they were not concerned enough to ever **open the fuel caps** and check the fuel level — OR the fuel plungers — to insure they had a full fuel load. Guess what we found when we checked the fuel tanks? The plunger in the right wing filler was stuck **down.** We fueled the aircraft, pulled the plunger up with a big pair of pliers, and added 200 pounds of fuel to the tank!

Our Reese transient alert folks were sharp enough to find this discrepancy that 3 other bases had overlooked. A check of the T-37 refueling checklist and associated tech orders revealed there is **NO** guidance for maintenance to check the plunger in the up position while refueling. That little "NOTE" in our Dash One is the only thing going right now. I have submitted an AFTO Form 22, Tech Order Change Request, to have a "CAUTION" added to the refueling checklist.

**Major Clark**
**64 FTW Reese AFB**

# SUMMER WEATHER NOT HARMLESS

Capt R. J. Dick
400th SMS, F.E. Warren AFB



As comes to all good Combat Crew persons, winter finally passes, spring breaks and summer, hopefully, is not far behind. The survival kits, long johns and parkas packed away until next winter, we begin to think of hot days, dry roads, trout-filled streams and picnics in the woods. No dangers from mother nature now, right? Wrong. Looking at the other side of the climatological coin as it affects us in our work and play, those same geographical/climate related phenomena that gave us that wonderful winter we all just survived, are the same ones that now demand our alertness to the many insidious dangers of warm weather.

What you ask, after one of those severe northern-tier bases winters, could be dangerous about beautiful, warm weather in the Dakotas, Montana or Wyoming? Well, that is a fair question and the answer is: several noteworthy items, according to Dr. (Lt Col) Frederick B. Fishburn, Flight Surgeon, USAF Hospital, F. E. Warren AFB, Wyoming, who contributed his expertise to the development of this article.

Heat disorders, insect bites, ticks, bee stings and hypothermia are some of the more common but least likely dangers to be remembered by all of us in our normal day to day work or play routines.

Wait a second, you say. Hypothermia? We've heard about that all winter. That's a cold weather problem. Has nothing to do with summer or warm weather, you say. Well, if you believe that, this article is must reading for you.

Hypothermia takes a new twist during the summer months. Water skiing and swimming in cold, high elevation lakes and streams are predominantly where we find hypothermia victims. It can also become a serious problem for those who camp or hunt in mountain or high plateau areas where the temperature drops substantially during the night and the individual is not prepared. Dr. Fishburn

explains: "Hypothermia is the lowering of the inner core temperature of the body. As the condition progresses, there is an increasing lack of coordination followed by loss of judgment and a fairly rapid descent into unconsciousness and subsequently, death. Immersion in water having a temperature of less than 92 degrees will cause the body to cool. Body heat loss rate increases as the temperature of the water decreases. Since water allows a rate of heat exchange approximately 25 times greater than that of air at the same temperature, hypothermia is the result."

Research has shown that in water temperatures above 70 degrees, survival time depends solely upon the fatigue factor of the individual. There have been cases of people surviving in excess of 80 hours at these temperatures. Between 60 and 70 degrees Fahrenheit a person can survive up to 12 hours. From 50 to 60 degrees Fahrenheit, a survivor has a reasonably good chance if rescue is completed within 6 hours. Therefore, when the water temperature drops to as low as 40 degrees Fahrenheit, as is the case with many of the mountain lakes, even when the air temperature is much warmer, most survivors will not live longer than 1 hour. In such low temperature water, the effect of hypothermia on the body is so extreme, so rapid, that the strongest swimmer would not be able to save him/herself. In fact, once immersed, the more the hypothermia victim struggles or attempts to swim to safety, the faster body heat is lost and the faster hypothermia takes its toll.

The point here to keep in mind is: be careful and prudent around cold mountain lakes and streams. "If you must swim or water ski where the water temperatures may be considerably below body temperature," advises Dr. Fishburn, "wear a wet suit and remain in the water for short periods of time only. If hunting or camping in high elevation areas where the temperature may drop considerably overnight, wear sufficient warm clothing to protect." Dr. Fishburn adds: "Remember, shivering is one of the first signs of hypothermia. Take immediate action to warm the body. Should you discover a person suffering from advanced hypothermia, get that person to a hospital immediately."

Okay, now that we have hopefully convinced the reader that jumping or falling into very cold bodies of water may be hazardous to his health, let us now discuss some of the other summer dangers you might encounter on or off the job and out of the water. We will zero in on heat disorders. Specifically, heat exhaustion, heat cramps and heat stroke.

The sun's effect on all of us can be much more damaging than we fully realize. At higher altitudes, for example, the sun's ultraviolet rays are not filtered out to the same extent they are at lower altitudes and this can cause a more severe burn to the skin in a much shorter period of time. Working and playing to the point of fatigue or exhaustion can lead to severe heat disorder problems. Driving long distances in overheated vehicles, breaking down on the highway and trying to cut across country for help with a blistering sun beating down, are all potentially the ingredients necessary for a heat disorder recipe.

In the case of heat exhaustion, overexertion under high heat conditions, such as while working or participating in recreational activities, is sufficient to bring on the symptoms. As Dr. Fishburn explains: "Heat exhaustion results from circulatory failure brought on by excessive loss of water and salt by the body. Symptoms are manifested by headaches, mental confusion, giddiness, fatigue, muscle cramping, extreme weakness and, in some cases, fainting. The skin is pale, cool and wet with sweat. Immediate action is necessary to relieve heat exhaustion by restoring the victim's circulation to normal, and by replacing the salt and water he/she has lost."

Heat cramps many times can be a predecessor to heat exhaustion. According to Dr. Fishburn: "Heat cramps are again primarily caused by lack of salt in the body because of insufficient salt intake or excessive loss of salt by sweating. Dehydration due to excessive sweating may also play a part in producing these cramps. The symptoms of this condition are excruciatingly painful cramps of skeletal muscles, chiefly the muscles of the abdomen and of the calf of the leg. The affected muscles tighten into a rock-like lump. A severe untreated attack may last for 6-8 hours. The body temperature may be slightly above normal."

It is important in both heat exhaustion as well as heat cramps to replace lost salts and liquids. Dr. Fishburn offered a simple method of doing this. Mix two teaspoons of salt in a glass of orange or lemonade juice. The tartness of the juice will cover the taste of the salt and will replenish the salts and liquids necessary. Also, in treating heat exhaustion, Dr. Fishburn recommended that the victim be moved to a cool place and put in a horizontal position so that he/she receives adequate circulation to the brain. Replace lost salt and liquids if possible. Elevate the patient's feet and rub his arms and legs, massaging toward the heart. Transport to a doctor/hospital.

Heat stroke on the other hand is the most serious type of heat injury. Commonly referred to as sunstroke, the death rate from this condition ranges from 20 percent to 50 percent. Again, Dr. Fishburn: "Heat stroke results from inadequate loss of heat, over-heating and damage to the heat regulating center of the brain. The most important feature of heat stroke is the extremely high temperatures which accompany it. There may be signs of impending heat stroke such as headache, dizziness, mental confusion, frequent desire to urinate and diminished or lack of sweating. However, usually, heat stroke starts with sudden collapse and loss of consciousness leading to coma. The patient's skin is red, hot, and dry accompanied by an absence of sweating." What to do? "Get the patient to a hospital immediately," said Dr. Fishburn. "Lowering the patient's body temperature as rapidly as possible, under a doctor's care, is the most important factor in treating heat stroke," he said.

Well, have you heard enough about warm weather dangers? Allow me a few more words on the subject and I'll turn the summer back over to you.

Depending on your geographical area, insect, spider and snake bites in addition to bee stings, ticks and other pests are other dangers of warm weather. Insects and non-insects can carry disease. A good example is rocky mountain fever carried by ticks. Spider bites, such as the black widow's, and snake bites, such as the rattlesnake, can be incapacitating, if not fatal. And, bee stings can cause anaphalactic shock in certain persons.

Summer weather is beautiful, yes. Harmless? No, not necessarily. The northern tier bases and their surrounding geography especially lend themselves to peculiar dangers. Being aware of these dangers and practicing common sense will help you enjoy a safer, happier summertime.

# BIG INSTRUMENT

## Instruments, Weather, and VDPs

**Capt Tome H. Walters, Jr.**
**1st Combat Evaluation Group**
**Barksdale AFB, Louisiana**

**Instrument Flying 101** — How would you like to suddenly become the smoothest instrument pilot in the unit? Draw rave reviews from stan eval. Have your ops officer take notes when you cover instrument techniques with your copilot. I can't wait, you say. What is this incredible secret? All right, Bunkie, here 'tis. (Discovered only this week in a mason jar buried in the basement floor at the old Instrument Flight Center.) It's called the Control and Performance Concept. (Patent pending.) Simple. Straightforward. Not a single formula. Only four steps: (1) Establish an attitude and power setting on the control instruments, (2) Trim, (3) Crosscheck performance instruments, then (4) Adjust the attitude or power setting, if required. As with any new system, there are a few points that must be emphasized.

DO NOT chase performance instruments. Stan Eval types often watch folks fly the airspeed indicator all day. Have to nail those tolerances, right? Well, yes. Question is, how? The answer is to set the pitch and the power and trim hands-off. The airspeed will stay exactly where it is supposed to stay. But what pitch or power setting, you ask? CFIC has done an excellent job of developing, collecting, and compiling "Rules of Thumb" for flying the tactical aircraft. The instructors in your unit can give you a target pitch and power reference for almost every phase of flight. Do I get a money-back guarantee on every reference they give me? No. But every one will be darn close. And that leads to the next point.

Smooth aircraft control is predicated on making a precise change — a predetermined, definite change. Not pulling the nose up or pushing the nose over. But, a rational disciplined approach. "I'm climbing out. The attitude is set. It's trimmed. Now crosscheck. Airspeed is 5 knots high and slowly increasing. I'll add 1° to the pitch, hold it, retrim, and wait a moment to allow the change to take effect." Trim, by the way, is most important. Failure to retrim after a change may be the most common mistake made.

Good instrument flying depends on a good crosscheck. Ever found yourself behind the aircraft having a problem with airspeed or maintaining course? Suddenly a panicky feeling grips your stomach when you realize you haven't looked at the other gauges for an eternity. You look in a hurry and hope. At that point, you know your crosscheck is slow. The good book of Instrument Flying has an excellent discussion of crosscheck technique and crosscheck analysis. We could not improve on it if we tried. So, we'll emphasize only one point: "The attitude indicator is the only instrument which you should observe continuously for any appreciable length of time."

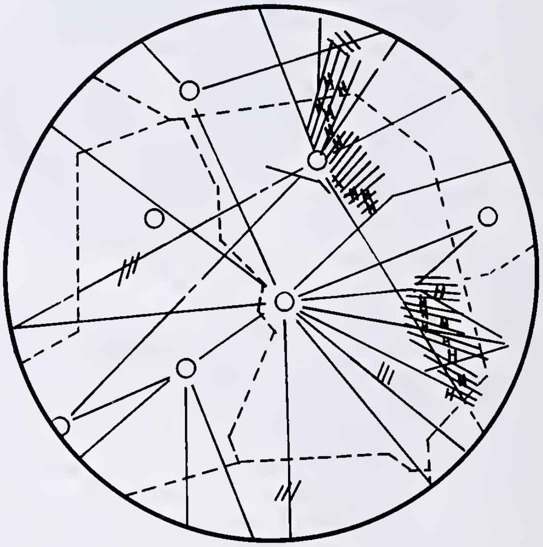


FIG. 1

Attitude instrument flying does more than make you look good on a check. It cuts your mental workload significantly. You know the aircraft is doing what you want it to do. Now you can think ahead. And, most importantly, you can CLEAR more often.

**ATC Weather Assistance** — In the past few years, ATC has transitioned from broadband radar to a sophisticated new narrowband called RADAR DATA PROCESSING (RDP) system. The RDP system takes the information from the antenna site, digitizes it, and feeds it over phone lines into a computer which generates a picture on the controller's scope. In other words, what the controller sees is no longer the actual reflection from an aircraft or its transponder, but a computer generated display. He no longer sees the actual reflection from significant weather, either. We think a brief explanation of the new equipment, its capabilities, and limitations might be useful for aviators looking for some help dodging a line of thunderstorms running from Nogales to Minneapolis. The RDP system has an electronic subsystem called the Weather and Fixed Map Unit (WFMU) that analyzes weather returns. When the returns exceed preset threshold settings for moderate or severe weather, the WFMU displays the area on the controller's scope as a series of radial lines. Severe weather within a storm cell is depicted as "H" symbols within the radial lines. (Fig 1) The threshold settings were developed from several studies on storm activity by the National Severe Storm Laboratory at Norman, Oklahoma. The moderate weather area will include from 0.1 inch to 1 inch of rain per hour and possible light turbulence. More than 1 inch per hour (with progressively severe turbulence) will cause the "H" symbols.

From the controller's standpoint, RDP is a significant improvement. Weather returns no longer appear as blobs on the scope, blocking out targets he is controlling. He can track aircraft continuously through areas in which he previously would have lost them. A handout for Air Traffic Controllers on the WFMU points out that computer analysis "assists the controller in recognizing the significance of the actual weather." Random conversations with ATC personnel across the country have brought out some interesting points. First, the old broadband radar still exists for backup capability. Older controllers, like older navs, have developed a lot of skill in their years of reading those "blobs." Some controllers, as a matter of technique, will flip over to broadband and compare the presentations before advising aircraft of the best vector through weather. Second, that skill interpreting broadband will decrease as it is used less and less in the future. That will not be a problem, though, lest you become unduly concerned. And future improvements, such as multi-colored displays, are already in the mill.

A closing note. SAC Supplement 1 to AFR 60-16 tells us not to rely on ground radar as primary means for avoiding thunderstorms. With good reason. Weather assistance is a secondary function for a controller. Traffic separation is his main job. His equipment is improving, but you still have the edge. Airborne radar, eyeballs, a good working knowledge of 60-16 rules, and a willingness to return to fly another day will keep thine air machine undented.

**Visual Descent Points (VDPs) Revisited** — An occasional caller will ask, "Do you evaluate whether or not we use visual descent points?" (The answer is, "We sometimes evaluate the results of not using them.") Two other points normally follow: they sure are hard to compute, and why do I need them, anyway? Fair enough. Let's address the second point first.

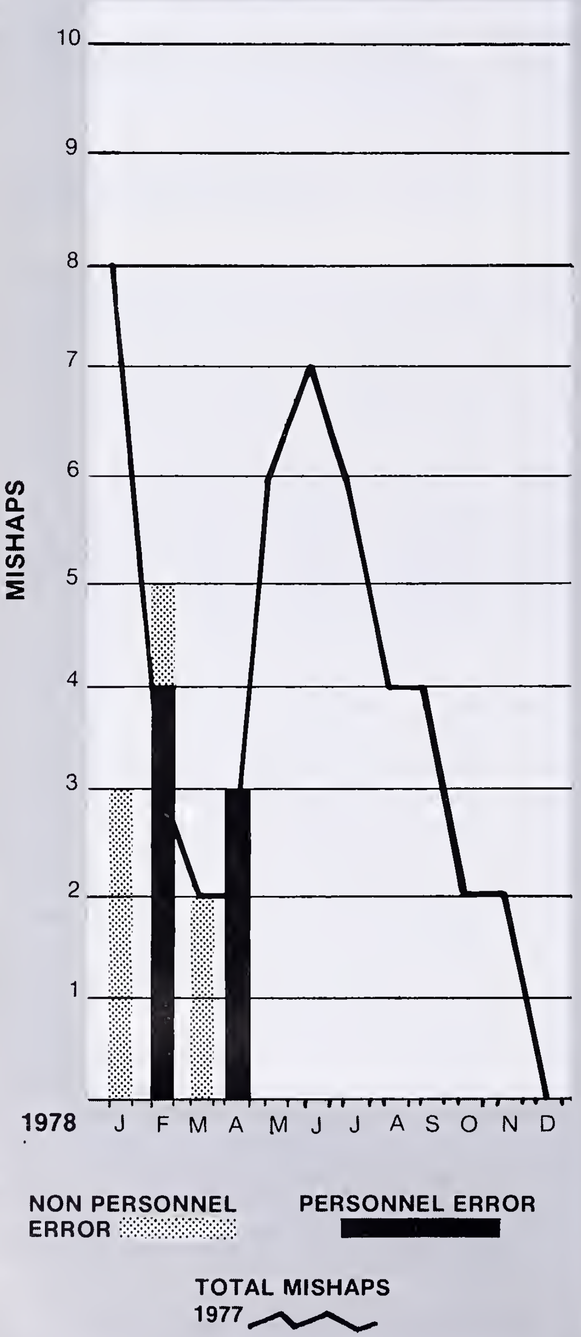
We need visual descent points to land safely out of nonprecision approaches. Instrument training in the past has been primarily concerned with getting from a final approach fix to a missed approach point (MAP). The problem is that the 781 does not close out at the MAP. That last three to four hundred feet is of more than passing interest. The recognition of a need for a technique to transition to a safe visual landing has been slow in coming for two reasons: we are in the habit of flying the nonprecision approach to a missed approach on check profiles, and we seldom get to fly a nonprecision to a landing when the weather is down around our ears. The TLAR (That Looks About Right) method works well on a VFR day. When it's 400 and ¾, there are some hidden dangers caused by the low visibility. The visual cues might not be there, or they might be misleading. Departing the minimum descent altitude (MDA) too early can lead to a low, flat approach. The opposite situation, leaving the MDA too late, can cause a steep, idle power dive at the runway. Either situation is dangerous. Use of the visual descent concept allows a normal descent rate from the MDA to the runway. Computing the VDP is basically two steps. First, figure how far from the end of the runway you need to start down from the MDA. A 2.5° glide path will lose 250 feet per mile and a 3.0° glide path will lose 300 feet per mile. (Look on the approach plate or the IFR Supplement to determine the glide path to use.) How much altitude will you have to lose? That's easy. It's given: the HAT. The only calculation is to divide two numbers. Example: HAT is 400 feet, and G. S. of 2.5°. How far from the **end of the runway** do you need to start down to fly that 2.5° glide slope? Answer: 400 = 1.6 miles.

The second step is turning that distance from the end of the runway into a DME. And that's just a matter of locating the TACAN (or VOR/DME)

**Continued on page 30**

# Missile Mishap Report

DOD CLASS A, B and C



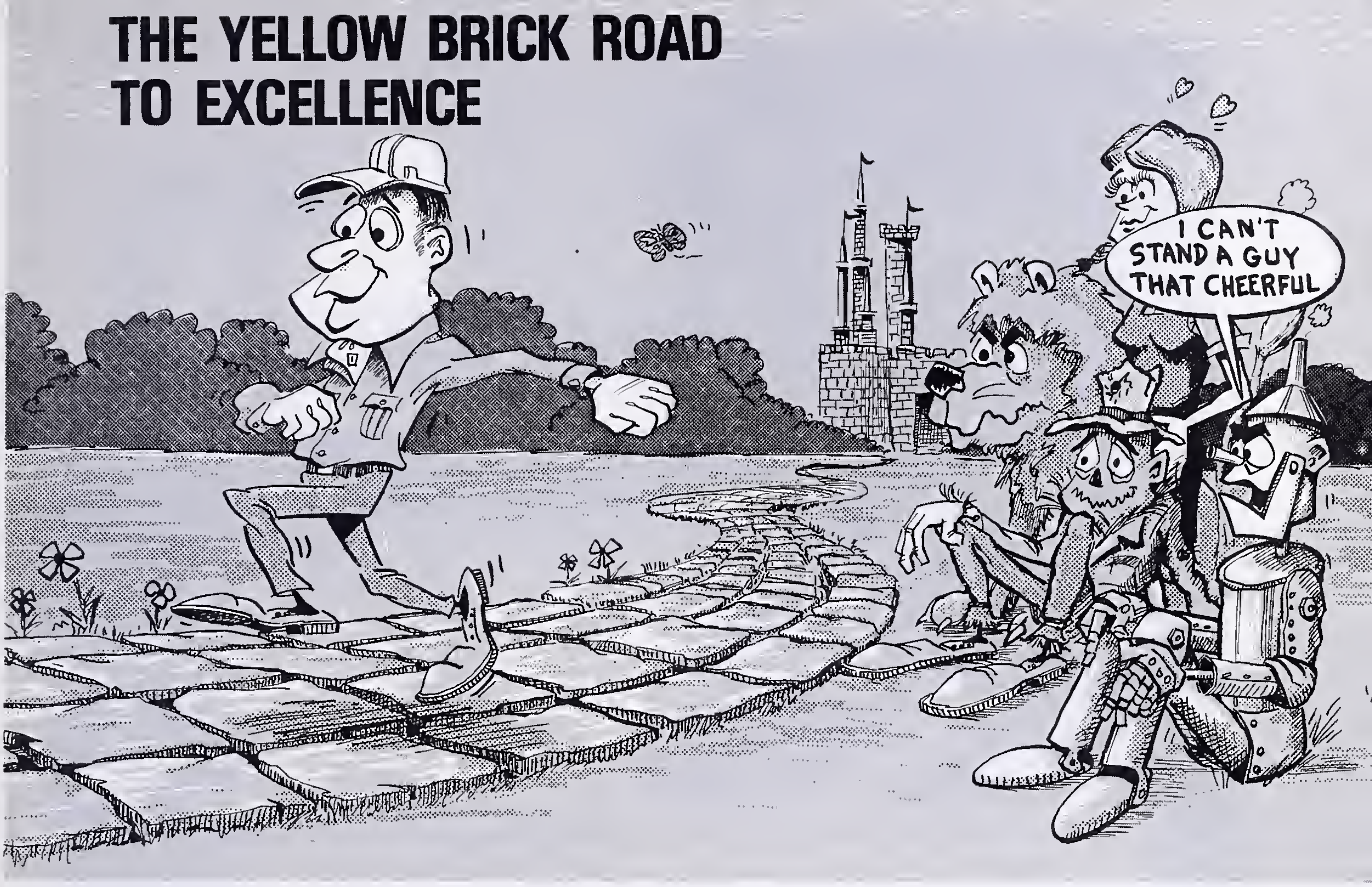
**LACK OF ATTENTION TO DETAIL** . . . At a TITAN facility a lack of communication and failure to pay attention to the immediate task at hand caused damage to a fire water pump motor. A maintenance team discovered a limit switch had failed causing a plug valve to remain closed when the "Plumbing Shutoff" pushbutton was released. The maintenance team failed to identify this condition by using an AF Form 1492, Danger Tag, and then a MCCC accidentally pressed the "Plumbing Shutoff" pushbutton while attempting to unlock the surface gate. The "Plumbing Shutoff" pushbutton is located immediately below the surface gate pushbutton on the Commander's console. This is another mishap that could have been easily prevented had the personnel involved paid attention to the task at hand.

**SRAM FINS** . . . Three of the five SRAM mishaps in the first quarter of this year have involved damage to the fins of the missile. All personnel realize that the tolerances involved in the upload/download operations are very close and that working conditions are not always the best. Realizing these factors, we should focus our efforts on this vulnerable target to prevent future recurrences.

**LF BATTERY PROBLEMS – A DIFFERENT VIEW** . . . Most LF battery mishaps have been caused by the failure of the battery charger. This time during a battery change the battery charger cable was not reconnected to the distribution box and eventually caused the condemnation of three LF batteries.

This mishap occurred when a team as directed by technical data, disconnected the battery charger cable; however, an equipment malfunction prevented this team from completing the task and they returned to base. A different team arrived on the following day to complete the job. In the process they were distracted by other disassociated maintenance problems. These problems were corrected, but the team failed to realize during the remainder of the battery change or LF backout that the battery charger cable was disconnected. The lesson learned is to ensure that you are aware of the condition of the facility when you start at the beginning or take over in the middle of a task and that you follow all tech data procedures. Remember, at the very least, you or one of your co-workers will have to correct your mistake or repair the damage if you do not do the job properly the first time.

# THE YELLOW BRICK ROAD TO EXCELLENCE


I CAN'T STAND A GUY THAT CHEERFUL

**Lt Col John F. McCoy**
**448 SMS Grand Forks AFB**

Assuming you want to excel as a crewmember, how do you get there from here? There are countless advisors and sources of guidance. Virtually everyone seems to have a theory. Not wanting to be different, I will take this opportunity to add my two cents. First, my "qualifications" as a self-appointed sage. Basically it amounts to 15 years in the missile operation field, which includes four as an MCCC, nine as a staff officer at wing, 15AF, SAC and the last two years as a Squadron Commander. As the cynics would say, that and 25 cents will get you a cup of coffee. Maybe so, maybe no.

Observation: excellence as a crew member follows exactly the same equation today as it did in 1962! Simply stated, it is having an "in-depth knowledge of the weapon system and the EWO." These words are frequently used in OERs today just as in 1962, possibly they appeared in your latest report. How many of you really feel your knowledge is an in-depth one? Only **you** know that answer.

Ever hear of a standboard error and admit to yourself that "there, but for the grace . . . etc?" How often do you complete the monthly self-study **before** you go to recurring EWO or weapon system training? If you always do, you get more out of the class. Do you prepare for a DOT MPT ride as you would a standboard? Do you understand, have you wargamed each checklist in the T.O.? Do you regularly **study** the T.O.? *Excellence is always based on consistent, individual effort.* This is as true in the missile business as it was when you were struggling through differential calculus in college.

There is a common misconception that MPT rides will develop your proficiency. No so, Charlie Brown — trainer time may refine your techniques and your style but it cannot provide a knowledge transfusion. Yes, you do learn how to deal with a specific script event but unless you fully understand the T.O. procedures, you have learned little. A slight change in the sequence of indications, the time interval, whatever and you have a new "event." Are you ready for the twist? No? You can be — but it takes consistent, hard study that only you can accomplish. A good instructor can teach you facts and even concepts. But the proper application of this material by you is analogous to eating one of those pastrami sandwiches from our cafeteria — *how well you digest it depends on how long and how carefully you chewed on it.*

Start chewing now! Turn off the soap opera for an hour and crack the T.O. Who knows what will happen? You might even lose that occasional uneasy feeling that you're really just winging it and haven't truly mastered your job. Knowledge is power, go after it, acquire it, apply it, publicize it. Excellence is not down the yellow brick road, it's right there in your T.O.

CAUTION
DO NOT EXERT PRESSURE ON EXIT CONE

**SSgt Heimberger examines the electrical circuitry on a missile being transported.**

# MAINTENANCE MAN OF THE YEAR

**TSgt. Jim Hansen**

An Ellsworth airman has been named to receive the General Thomas S. Power Award as the Strategic Air Command Maintenance Airman of the Year for 1977.

Staff Sergeant Craig L. Heimberger, a missile handling team chief with the 44th Organizational Missle Maintenance Squadron, was chosen from among 30,000 SAC personnel serving in aircraft, missile and munitions maintenance specialties.

In naming Sergeant Heimberger for the award, SAC's Commander-in-Chief, General Richard H. Ellis, said the award "represents selection from an elite group of skilled maintenance personnel who have demonstrated their professional competence. This is the highest individual award given to a SAC maintenance technician."

Commenting on the award, Sergeant Heimberger said, "One man cannot be an island on this job. I was fortunate to receive tremendous support from everyone concerned, from the wing commander to my team members." He added, "I'd like to saw the trophy into four pieces — one piece for each of my three team members, and give my share of the trophy to my wife."

Colonel Albert W. Davy, 44th Strategic Missile Wing Deputy Commander for Maintenance, said, "It is through hard work and careful attention to detail that Sergeant Heimberger's efforts were recognized. He has set a standard for others to strive for."

The 29-year-old sergeant, a native of Highland, Indiana, has been stationed at Ellsworth for nearly all of his nine-year career.

## FROM THE 2ND BMW

**EDITOR** — An article in the March, 1978 issue of Combat Crew, "Coping with the Compass," by Capt Michael R. McNeill, has some good information about trusting your heading shot and using the whiskey compass, but there is also an inaccuracy that should be brought to the attention of the crewmembers. The third from last paragraph says that, when the navigator turns the latitude knob out of the OFF position (DG mode), the autopilot won't follow the N-1 if the compass drifts right or left. This is not true, and reference to the KC-135 Dash 1, section IV, explains that "The N-1 compass, operating either as a magnetic slaved compass or a directional gyro, supplies heading reference data to the autopilot." and "When the aileron axis is engaged, the autopilot continues to fly on the heading that the airplane was flying at the time the aileron axis was engaged." The best example of the situation is whenever we fly a grid leg, and experience precession. The indication of the N-1 compass does not change; the **aircraft** turns.

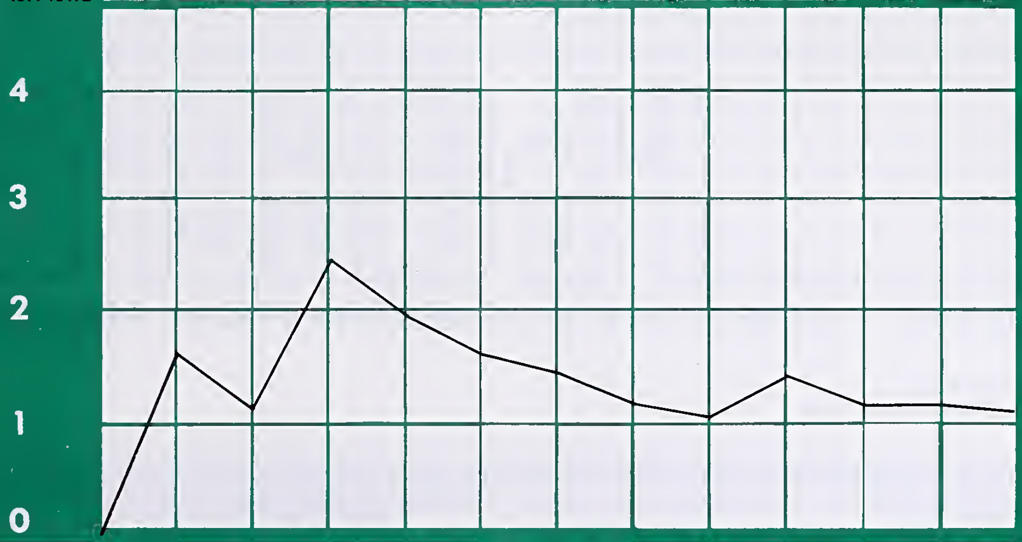
There doesn't seem to be any specific guidance about what you must do if a compass system fails inflight. It is a matter of judgment as to whether to continue the mission or land and get it repaired. Most individuals I have talked to agree that, if you continue the mission, you would probably use the J-4, and then the whiskey compass, in order, and hand-fly the headings. Entering grid just so that you can use the heading hold function of the autopilot would be a last resort, and I believe that TH grid or MAG grid modes should be strongly discouraged, for navigational technical reasons. A final caveat, from section VIII of the dash 1, is that "in no case will one compass be reset (corrected) to agree with the other compass without first obtaining a celestial heading check."

**Capt Gary C. Eickmeier**
**2BMW Navigation Officer**

# 1978 Flying Safety Rate

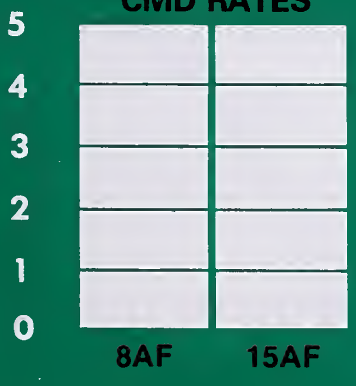
## SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 RATE | .00 | 1.66 | 1.07 | 2.42 | 1.96 | 1.64 | 1.43 | 1.23 | 1.09 | 1.30 | 1.18 | 1.09 |



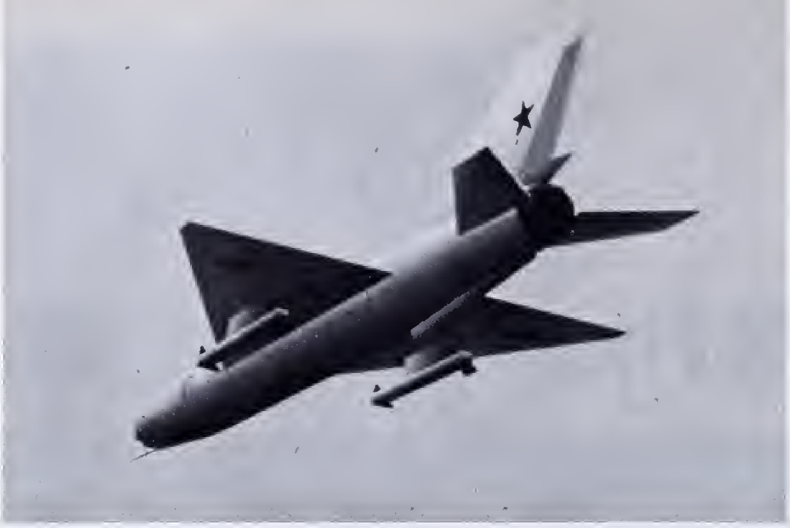
| MISHAPS | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1977 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1978 | 0 | 0 | 0 | 0 | 0 | | | | | | | |

### 1978 SUBORDINATE CMD RATES



### MISHAP STATUS

LEGEND ⁀ =1977 RATE



MIG — This photo dramatically displays the effect of edge smoothing. The model was created with approximately 750 straight lines.

# r&d corner

## HQ/SAC — DIRECTORATE OF AERONAUTICAL REQUIREMENTS

**Major Bernie Kane**
**HQ SAC/XPMD, Offutt AFB**

**FB-111** aircrew simulators at Pease AFB NH and Plattsburgh AFB NY are currently being modified with modern Digital Image Generation (DIG) visual attachments. The first system is scheduled to be ready for training at Plattsburgh in May 1978, with subsequent installations on the remaining two FB-111 simulators to be completed in June and September 1978. The three SAC systems are the first of ten devices to be delivered to the Air Force for F-111 series simulators.

The DIG System, developed by Singer Link, represents significant advancement over previous approaches to "out-the-window" visual displays. One early approach employed model boards with closed circuit TV cameras which "flew" over a detailed but limited gaming area. These systems are used in helicopter and UPT simulators where high fidelity visual cues are required. Model board systems have limited utility in bomber simulators due to physical limitations on the size of the gaming area. They require larger facilities and additional electrical power for camera drive and lighting. Second generation visual systems provided night imagery in the form of computer generated light points. Improved night only systems now provide dawn/dusk/night scenes which include runway lighting, texturing and markings, horizon glow and surrounding light points, but are limited to local area coverage.

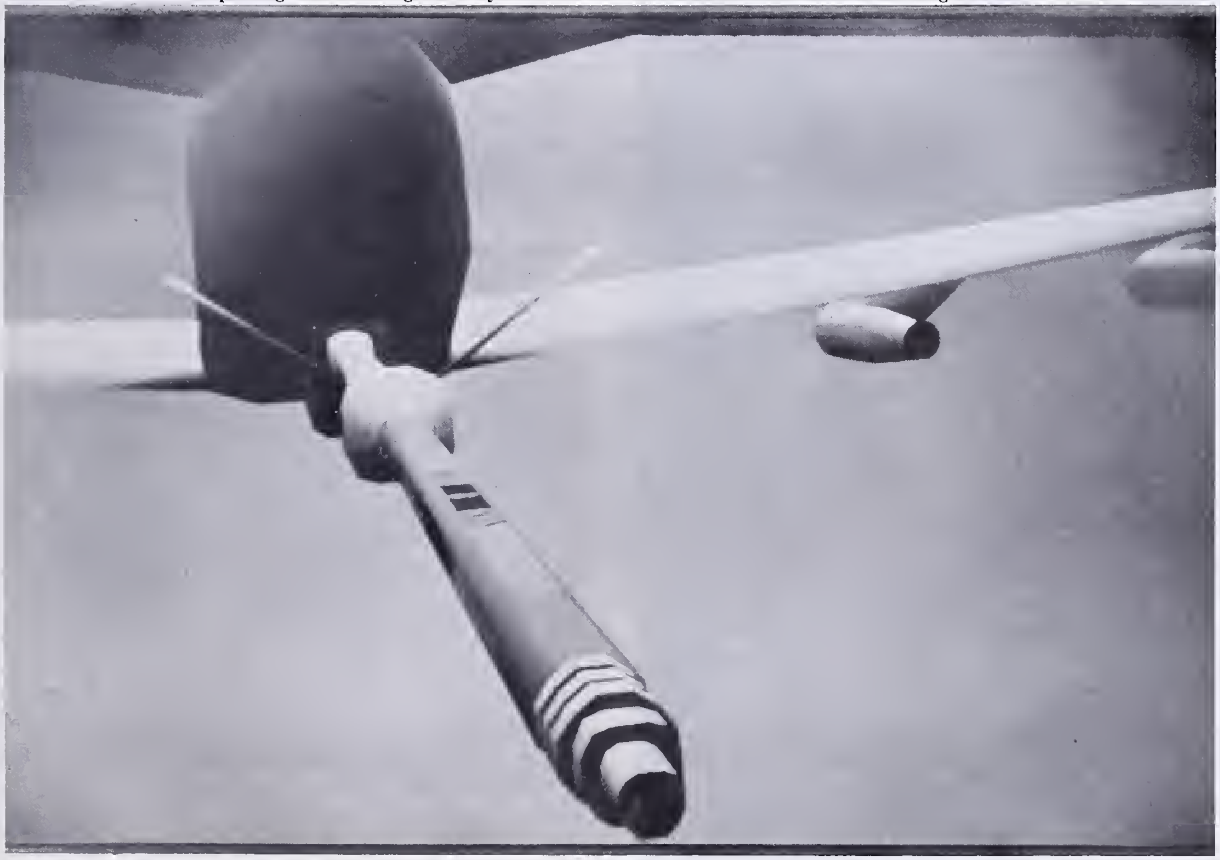
Visual cues required for the FB-111 mission are of a more complex nature because of the tasks required. The DIG system will provide the cues necessary to acquire and practice most of the visually oriented skills required by the FB-111 aircrews. The system will display day and night visual scenes or runway environments, low altitude routes, a KC-135 for air refueling, FB-111 for formation flying, SAMs, AAA, and attacking fighter aircraft for bomber defensive tactics training. Flight over a 600 by 600 nautical mile area can be conducted without interruption, and the gaming area can be expanded by changing computer disk memory units while inflight. The level of detail in any computer generated scene is limited only by the capability of the image processor and the computer model of the area.

A visual system control panel at the FB-111 simulator instructor station will allow instructors to manage visual parameters displayed to the crew during training missions. Visibility can be varied from 0 to 20 miles in 0.1 mile increments; RVR from 0 to 4900 feet in 100 foot increments, ceiling from 0 to 20,000 feet in 100 foot increments; cloud coverage from clear to overcast; cloud thickness from 1000 to 15,000 feet in 1000 foot increments; and time of day is variable from noon to night. Instructors can control rain and lightning displays and vary the intensity of runway, VASI, taxiway and tanker director lights. Sequencing of tanker director lights will be automatically controlled by a special computer algorithm which directs the receiver to the precontact position and provides directional signals in the contact position.

A data base modeling center will be included as support equipment for the FB-111 visual system. The capability to create new gaming areas or to enhance existing gaming areas will be provided as an independent function which can be performed by either contractor or Air Force personnel. By use of special purpose computer programs and an electronic digitization system, a representative gaming area can be created. Additionally, a program will be provided which allows the modeler to generate air targets with relative ease. The positional accuracy of the gaming area modeling system is such that a point can be located within ⅜ of an inch of its real world position.

The delivery of the FB-111 visual system is part of a continuing effort to update SAC training devices to current flight simulation state-of-the-art. Castle AFB recently accepted delivery of two B-52G and one B-52H Digital Cockpit Procedures Trainers. These devices were antiquated analog devices converted to modern digital trainers. Castle will also be receiving Air Refueling Part Task Trainers for B-52 pilots and KC-135 boom operators to be delivered in June 1978. The training capability for all B-52 and KC-135 crew members will be enhanced with the addition of the B-52 and KC-135 Weapon System Trainers which will be coming into the SAC inventory in 1980. These new training systems will be discussed in a future R&D Corner column.

**Tanker — Computer generated image of fully extended boom. The errors in extension markings have since been corrected.**



# PROFESSIONAL PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence outlined in SACR 127-2.

## HEADS UP FLYING CLUB

**TSgt James R. Wallace, assistant airfield manager at Ellsworth AFB has been selected as a Professional Performer for the month of June.**

**One morning, Sgt Wallace noticed a thin formation of ice/frost forming in front of base operations. He moved quickly to check the active runway and realized the urgency of the situation. He advised the tower to delay all launches, one of which was a scheduled three ship MITO. The RCR had deteriorated from dry to RCR 08 in a very short period of time. The ice/frost formation was not forecast, suspected or observed by other personnel. After completing the RCR check, the information was immediately passed to the supervisor of flying, who was able to advise the aircraft awaiting takeoff. Shortly after the MITO launch, a B-52H aborted his takeoff roll. Had the crew not made an adjustment in the decision speed, it is conceivable that a serious mishap would have occurred. His quick reaction and accurate decision to advise the delay of the scheduled takeoffs reflect astute judgment and the willingness to accept responsibility for his actions.**

22d Bombardment Wing, Crew S-104: P Capt Gerald L. Kraus, CP 1Lt Stephen C. Ghering, N Capt George E. Morrow, and BO TSgt Robert E. Loman.

## FLYING CREW

What was to be a normal night training mission quickly changed. During the interior inspection, command post called and advised the crew to stand by for an ASAP launch. A C-5A was experiencing an inflight emergency and was low on fuel. The aircrew launched ASAP and the center advised that another tanker was in the process of rendezvousing with the crippled C-5A. The other tanker crew indicated that they would be able to make the entire offload. However, Capt Kraus' crew decided that they would join up with the flight and accompany them to Altus in case they were needed. Shortly after air refueling contact with the Castle tanker, the C-5A lost an engine and decided to abort the air refueling and execute an emergency landing at Edwards AFB. The other tanker then received clearance and proceeded to home plate. Shortly after this, the C-5A restarted his engine and decided to continue to Altus AFB. After coordination with the C-5A, it was determined that an alternate rendezvous would be conducted since no navigator was aboard the C-5A. After completing the rendezvous it was determined to refuel at 200 KIAS as the C-5A's nose landing gear was extended. This was as slow as the tanker could fly based on its gross weight. Due to the slower speeds and the nose landing gear hanging, the C-5A had difficulty flying to the contact position. The boom operator, TSgt Loman, skillfully talked the C-5A into the contact position. The C-5A pilot complimented the boom operator highly for his ability to talk him in. After air refueling contact, 70,000 pounds was offloaded and Capt Kraus recovered at March AFB. The C-5A continued to Altus AFB, landed on a foamed runway and sustained only minor damages to the aircraft and no injuries to the crew. Crew S-104 was able to successfully complete a very complex mission under difficult circumstances which required flexibility, innovation, expertise and outstanding professionalism.

## MINUTEMAN

Crew R-003 is the 91st Strategic Missile Wing nomination for SAC Crew of the Month.

Shortly after crew changeover, wing security notified the flight security controller that a serious civilian motor vehicle mishap had occurred in the flight area. The highway patrol could not respond due to blocked roads, and some of the victims were seriously injured. The crew rapidly evaluated the situation, coordinated with the on-duty security alert policemen (SAT) and the cook to accompany him to the scene of the mishap. He insured backup communications capability by taking the hand-held VHF radio with him in addition to the radio equipped vehicle. The trip to the scene of the mishap was extremely hazardous due to near zero visibility. After arriving at the scene of the mishap, Lt Perkins directed the SAT to provide traffic control for those vehicles not involved.

He and the cook loaded the injured into the military vehicle. An ambulance arrived from a nearby town and reported the road conditions prevented a safe return. A snow blower arrived and Lt Perkins directed the convoy back to the LCF. Lt Zunic and the on-duty facility manager had prepared the topside to receive the injured and stranded people. No medical personnel were in the ambulance, so the extent of the injuries, as well as the road and travel conditions, was assessed by the crew. Later, the crew directed and led another convoy, including the SAT vehicle, snow blower, ambulance, and the crew vehicle to the nearest hospital. They also arranged for the removal of the wrecked vehicles into the town.

The calm, professional leadership exercised by this crew in the face of an extremely serious situation resulted in the expeditious treatment of seriously injured personnel, the safety of stranded motorists, and in the sound, logical assessment of priorities which may have saved lives.

91st SMW, Minot Crew R-003: MCCC 1Lt Michael K. Perkins and DMCCC 2Lt Mark A. Zunic.

## MAINTENANCE MAN

MSgt Ronnie L. Bean, Mather AFB.

**During the SAC no-notice MSET evaluation of MSgt Bean's area of responsibility, a tanker phase inspection was evaluated and received outstanding ratings on card and area items for an overall rating of outstanding. The results of this technical inspection contributed directly to the excellent MSET results achieved by the OMS Tanker Branch. MSgt Bean has developed improved job procedures for more efficient accomplishment of phase inspections. This was especially valuable during implementation of the Maintenance Steering Group (MSG-2) concept when he discovered an item that was unnecessary and impractical. MSgt Bean immediately brought this to the attention of SAC MSET. As a result, the requirement was deleted from the phase work deck and many valuable man-hours were saved throughout the command. MSgt Bean has also devoted many hours of overtime to upgrade his working environment which became much more efficiently organized. In addition, security of tools and equipment was greatly improved.**

## TITAN

During a recent crew changeover when the relief crew for R-111 was doing their topside inspection, they heard a "pop" and saw a vapor cloud coming from the topside fuel transport trailer. They immediately notified the crew on duty, R-111. Captain Schulte took immediate action to insure the safety of maintenance and operations personnel by recalling a maintenance team from the blast lock area to the control center and ordering the relief crew belowground. Based on additional information from the relief crew that the vapor cloud was drifting towards the silo, Captain Schulte closed the control center and silo blast valves as well as the blast dampers to prevent the toxic vapor from being drawn into the belowground area through the intake air shafts. Simultaneously, Captain Fontana notified the wing command post and the missile potential hazard team (MPHT) and kept them updated on all information. The relief crew came under the direction of Captain Schulte, and with Crew R-111 they worked as a smooth efficient team to prepare equipment for the propellant transfer system team (PTST) that had been dispatched to correct the situation. The valve which provides fire protection water for the topside area was opened, and the fire hose and adapter were positioned in the entry portal area for possible decontamination use. The vapor sensing system belowground was shut down to preclude possible hazard indications and wash down of the missile, which would have complicated an already hazardous situation. When the PTST arrived, Crew R-111 became a relay center for all information from the PTST to the MPHT. The wind speed and direction equipment was constantly being monitored to provide accurate and current information to the PTST. Since there is no technical checklist order which covers this particular hazard situation, it was the superior weapon system knowledge of Crew R-111 and their timely and accurate actions which insured that there was no additional damage to equipment and no injuries to either civilian or military personnel.

381st SMW Crew R-111 (l-r) MCCC Captain Henry J. Schulte, DMCCC Captain Thomas A. Fontana, BMAT A1C Stephen C. Moore, and MFT Amn William M. Birkner.

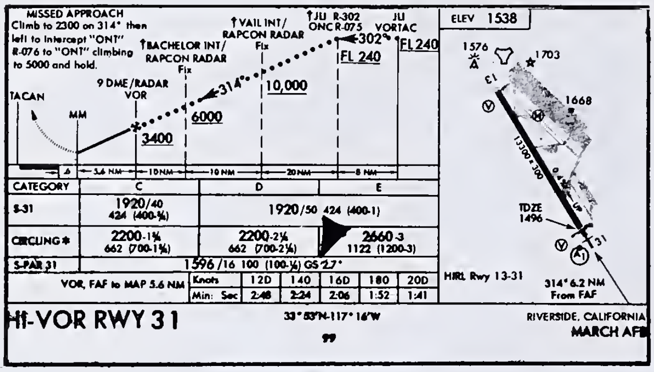


FIG. 2

## BIG INSTRUMENT Continued from page 21

and adding or subtracting. If the TACAN is halfway down a 12,000 foot runway, add a mile to that 1.6 and the VDP turns out to be 2.6 DME.

The HI-VOR, Figure 2, and the HI-TACAN, Figure 3, provide sufficient information for determining the DME for a visual descent point. The solutions are printed at the end of this article.

It may seem that VDPs have been pushed rather heavily these past six months. Well, "you ain't seen nothin yet." VDPs have proven to be a valuable asset when flying nonprecision approaches in a low visibility environment. Future changes to SAC flight manuals will include the requirement for crew members to compute VDPs when nonprecision approaches are planned. Therefore, if you have ignored or disregarded VDPs because they were too difficult to compute, or you just didn't understand their purpose, it may be advantageous for you to spend some time computing visual descent points on your next mission planning day. When you subsequently use these VDPs in flight, notice how they coincide with the VASIs. It's magic. By the way, the VDP for Figure 2 is $\frac{424}{270} = 1.6 + 2.8$ for TACAN location. Therefore, the DME for the visual descent point is 4.5. The answer to Figure 3 is 2.4 DME.

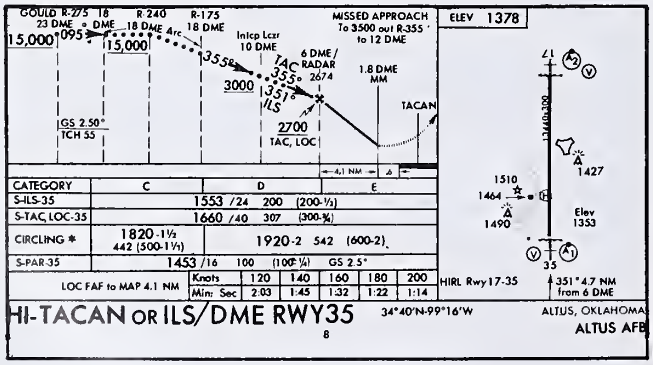


FIG. 3

**VERY QUALIFIED** — MSgt John Douberly, 390th SMW, receives his 21st "Highly Qualified" rating from Brig Gen Christopher S. Adams, commander, 12th AD. This latest presentation earned the Sergeant a unique distinction of having received the most of SAC's highest ratings on standardization evaluations. Sgt Douberly is currently assigned as a 390th Ballistic Missile Analysis Technician on the wing's senior standardization evaluation crew.

**BLASTED LIGHTER!!** Butane cigarette lighter, plastic, brand name Bentley Genie, is subject to explosion when dropped on a hard surface. A sergeant from the 92d AMS dropped the lighter which he received with a carton of cigarettes onto a tile floor and the lighter exploded on impact. Pieces of the lighter were thrown 50 feet from the impact point. No injuries occurred. Wing safety contacted the exchange and commissary managers and they are removing the lighters from stock. A newspaper article and safety flash are being published to warn personnel of the danger.

## TESTING ZERO-ZERO CAPABILITY FOR VEHICLES WITHOUT EJECTION SEAT AND CHUTE

# SAC SAFETY SCREEN

**6 SW, Eielson Crew S-02:** P Capt Irving F Romer, CP Capt Joe A Evans Jr, N 1Lt Steven M Watson, IN Benson Rukstalis, IE Maj James R Cartmill, IE Capt Donald A Freeman, NE Capt Richard A Frame, NE Capt Philip N Wright, NE Capt Russell O Wendt, NE Capt Kenneth L Herrich, SE TSgt Malcom E Baker, SE MSgt George C Duncan

**22 BMW, March Crew E-123:** P Capt Walter R Fus Jr, CP 1Lt Charlie R Suther, N Capt Mauro N Farinelli, BO SSgt George R Cloud

**42 BMW, Loring Crew E-12:** P Capt Paul M Augenstein, CP 1Lt Roger U Bisson, RN Capt Raymond F Bourgoin, N Capt Douglas W Butler, EWO 1Lt Michael A Smolin, G A1C Paul C Yanez

**42 BMW, Loring Crew E-111:** P Capt Bruce W Huester, CP 1Lt William Maiorano, N 1Lt Raymond D Gomes, BO Sgt Steven A Cordell

**42 BMW, Loring Crew E-159:** P Capt John S Klug, CP 2Lt Thomas D Trainor, N 1Lt James S Patterson, IBO SMSgt Charles E Cade

**44 SMW, Ellsworth Crew E-082:** MCCC 1Lt Paul A Dilella, DMCCC 1Lt Michael J Foster

**90 SMW, F E Warren Crew E-046:** MCCC Capt William N Wakerley, DMCCC 1Lt John W Moss

**92 BMW, Fairchild Crew R-23:** P Capt Rodney W Young, CP Capt David A Baldwin, RN Capt Thomas E Newton, N 1Lt Robert E Sasak, EWO 1Lt Mark C Rowe, AG MSgt Robert C Van Orden

**100 AREFW, Beale Crew S-101:** P Capt James E Williams, CP 1Lt Gary L Mayo, N Capt Lawrence A McFadden, BO SMSgt Herbert G Dunahoo

**308 SMW, Little Rock Crew E-102:** MCCC Capt Danny W Webb, DMCCC 2Lt Bradley T Flinders, MSAT SrA Stephen F Harding, MFT SrA Jimmy D Wiley

**341 SMW, Malmstrom Crew E-062:** MCCC 1Lt Joseph Dorris, DMCCC 2Lt Leon Baer.

**341 SMW, Malmstrom Crew E-068:** MCCC Capt Stephen Krant, DMCCC 1Lt Charles Johnson

**351 SMW, Whiteman Crew E-072:** MCCC 1Lt Donald E Price, DMCCC 1Lt James G Fowler

**393 BMS Pease Crew S-33:** P Capt Bob White, N Capt Gary Davis

**410 BMW, K I Sawyer Crew E-21:** P Capt Jeffery J Parker, CP Capt David Blessinger, RN Capt John A Grek, N Lt Daniel O Haggarty, EWO Lt Marc A Bringman, G SrA Glenn H Raasch

**410 BMW, K I Sawyer Crew R-122:** P Capt David W Roberts Jr, CP Capt Thomas P Sporte, N Lt Loren M Steenson, BO SSgt Dennis L Thornburg

**416 BMW, Griffiss Crew R-106:** P Capt John M Henderson, CP Capt Edward F Briggs, N 1Lt David M DeCarlo, BO Sgt Bruce F Parent

**509 AREFS, Pease Crew S-151:** P Capt Roy White, CP Capt Keith Witt, N Capt James Jolly, BO MSgt William Disque

**The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.***

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# HALL OF FAME

## TACTICAL FLYING

### OVER TWENTY-TWO YEARS

| | |
|---|---|
| 170 AREFG, McGuire (NJANG) | NONE |
| 171 AREFW, Greater Pittsburgh (PAANG) | Mar '58 |

### OVER NINETEEN YEARS

| | |
|---|---|
| 157 AREFG, Pease (NHANG) | Jun '58 |
| 97 BMW, Blytheville | Aug '58 |
| 940 AREFG, Mather (USAFR) | May '59 |

### OVER EIGHTEEN YEARS

| | |
|---|---|
| 307 AREFG, Travis | Sep '59 |

### OVER SEVENTEEN YEARS

| | |
|---|---|
| 19 BMW, Robins | Oct '60 |
| 151 AREFG, Salt Lake City (UTANG) | Feb '61 |
| 161 AREFG, Sky Harbor (AZANG) | Apr '61 |
| 126 AREFW, Chicago O'Hare (ILANG) | Apr '61 |

### OVER SIXTEEN YEARS

| | |
|---|---|
| 134 AREFG, McGhee Tyson (TNANG) | Aug '61 |
| 340 AREFG, Altus | Feb '62 |

### OVER FIFTEEN YEARS

| | |
|---|---|
| 301 AREFW, Rickenbacker | Jul '62 |
| 96 BMW, Dyess | Aug '62 |

### OVER THIRTEEN YEARS

| | |
|---|---|
| 160 AREFG, Rickenbacker (OHANG) | Dec. '64 |

### OVER TWELVE YEARS

| | |
|---|---|
| 320 BMW, Mather | Jul '65 |

### OVER ELEVEN YEARS

| | |
|---|---|
| 452 AREFW, March (USAFR) | Sep '66 |
| 92 BMW, Fairchild | Feb '67 |

### OVER TEN YEARS

| | |
|---|---|
| 55 SRW, Offutt | Jul '67 |
| 2 BMW, Barksdale | Aug '67 |
| 319 BMW, Grand Forks | Dec '67 |
| 22 BMW, March | Feb '68 |

### OVER NINE YEARS

| | |
|---|---|
| 5 BMW, Minot | Feb '69 |

### OVER EIGHT YEARS

| | |
|---|---|
| 42 BMW, Loring | Sep '69 |
| 141 AREFW, Fairchild (WAANG) | Oct '69 |
| 28 BMW, Ellsworth | May '70 |

### OVER SIX YEARS

| | |
|---|---|
| 7BMW, Carswell | Mar '72 |
| 101 AREFW, Bangor (MEANG) | Mar '72 |
| 416 BMW, Griffiss | May '72 |

### OVER FIVE YEARS

| | |
|---|---|
| 305 AREFW, Grisson | Aug '72 |
| 376 SW, Kadena | Nov '72 |
| 379 BMW, Wurtsmith | Apr '73 |

### OVER FOUR YEARS

| | |
|---|---|
| 384 AREFW, McConnell | Mar '74 |
| 189 AREFG, Little Rock (ARANG) | May '74 |

## ICBM

### OVER FOURTEEN YEARS

| | |
|---|---|
| 381 SMW, McConnell | Nov '63 |

### OVER THIRTEEN YEARS

| | |
|---|---|
| 90 SMW, F E Warren | Jul '64 |
| 1 STRAD, Vandenberg | Sep '64 |

### OVER TWELVE YEARS

| | |
|---|---|
| 308 SMW, Little Rock | Aug '65 |

### OVER EIGHT YEARS

| | |
|---|---|
| 341 SMW, Malmstrom | Apr '70 |

### OVER FOUR YEARS

| | |
|---|---|
| 390 SMW, Davis-Monthan | Jul '73 |

To gain listing in the Hall of Fame, a SAC or ARF unit must be Class A mishap-free for 48 months.